

Please cancel claim 13.

### REMARKS

The following remarks are submitted in response to the numbered paragraphs of the Office Action mailed November 6, 2000.

In response to paragraphs 1 and 2, applicants respectfully request reconsideration of the examiner's statement that "... claims 18 and 91-93 [the Group II claims, are] drawn to a pavement marker which is patentably distinct from the elected Group I invention [claims drawn to an article comprising an array of microcubes] for the reason discussed in paper no. 10." In paper no. 10, the Examiner stated that inventions II and I are related as combination and subcombination. These inventions are distinct if it can be shown that (1) the combination as claimed does not require the particulars of the subcombination as claimed for patentability, *and* (2) that the subcombination has utility by itself or in other combinations. The Examiner further stated that the combination as claimed does not require the particulars of the subcombination as claimed because the patentability of the combination does not rely on the details of the subcombination.

Applicants respectfully disagree with this statement, and maintain that the first requirement for patentably distinct inventions is not met. In other words, in this case the Group II claims do require the limitations of the Group I claims for patentability. Claim 18 (Group II) recites "The article of claim 11 [Group I] in which said array is a retroreflective part of a pavement marker." Pavement markers having retroreflective parts have been known for decades,

as disclosed for example in U.S. 4,208,090 (Heenan), already of record in this application and cited by the Examiner in the November 6, 2000 Office Action. The limitation that imparts patentability to claim 18 of Group II is the requirement requires that the retroreflective part be the article of claim 11, i.e., the Group I subcombination. Similarly, claim 91 of Group II recites "A pavement marker for establishing on a finished roadway surface a marking visible from an oncoming vehicle, said pavement marker comprising a base member adapted to be mounted on the finished roadway surface, and a retroreflective signal means said retroreflective signal means comprising an array of microcubes of claim 1." It is beyond question that the aforementioned Heenan '090 patent discloses a pavement marker for establishing on a finished roadway surface a marking visible from an oncoming vehicle, said pavement marker comprising a base member adapted to be mounted on the finished roadway surface, and a retroreflective signal means, all as recited in Group II claim 91. The limitation that imparts patentability to claim 91 is the recited array of microcubes of claim 1, i.e., the Group I subcombination. Claims 92 and 93, which depend from claim 91, recite further limitations relating to the array, i.e., the Group I subcombination. Accordingly, for each of claims 18 and 91-93, the combination *does* require the particulars of the Group I subcombination as claimed for patentability, so the Group II invention is *not* distinct (as defined in MPEP § 806.05(c)) and should be considered along with the Group I invention.

In response to paragraph 3, applicants note the examiner's statement in paper no. 10 that "Upon allowance of a generic claim, applicant will be entitled to consideration of claims to additional species which are written in dependent form or otherwise include all the limitations of an allowed generic claim as provided by 37 CFR § 1.141." It is believed that claim 1 is allowable for the reasons stated below, and that claim 1 is generic to the two species.

Accordingly, it is believed that the requested amendment deleting the limitations directed to pentagonal cube corners should not be necessary at this time.

In response to paragraphs 4 and 5, applicants submit herewith a terminal disclaimer of application claims 1, 4, 11, and 94 herein over U.S. 6,015,214. It is respectfully submitted that application claims 2 and 3 each contain limitations not recited in the claims of the '214 patent. Application claim 2 recites that the array is retroreflective. This limitation is not found in the claims of the '214 patent, and the claims of that patent could encompass non-retroreflective articles, such as masters, molds, electroforms, or tools having the recited cube corner elements and being suitable for use in the manufacture of retroreflective cube corner articles. Application claim 3 recites that the article comprises retroreflective sheeting. This limitation is not found in any of the '214 patent claims. Accordingly, a terminal disclaimer as to those claims should not be required. 9\.

In paragraph 6, the Examiner rejected claims 1-11 and 29-30 as being anticipated by Jungersen. Application claim 1 recites that at least one of the microcubes in the array is non-hexagonal. Applicants respectfully point out that in Figure 11 of the prior art Jungersen reference, the "reflecting units" 41 are indeed hexagonal (see the definition of "cube shape," instant specification at p. 18, lines 1-3). In the hexagonal cubes of Fig. 11 of Jungersen, each cube face is square, as compared to the hexagonal cubes in Fig. 10 of Jungersen, in which each cube face is pentagonal. The shape of an individual cube face is not the same as the shape of the cube corner elements. Claim 1 of the instant application recites the shape of a microcube, not the shape of a microcube face. Accordingly, claim 1 is not anticipated by Jungersen, and the remaining dependent claims are also not anticipated.

In paragraph 7, the Examiner rejected claims 1-3, 7-11, 26, 29-30 and 94 as anticipated by either Heasley '568 (Figs. 1-8) or Lindner '773. The Examiner specifically stated that he was interpreting the term "microcubes" to mean "little", "small," or "minute," in accordance with a standard dictionary reference. Applicants respectfully point out that the term "microcubes" as used in the claims is specifically defined in the instant specification, at page 19, lines 18-20, as amended by the preliminary amendment filed along with the instant application. Accordingly, the term "microcube" as used in the claims herein should *not* be interpreted in accordance with a standard dictionary definition, but by applicants' own definition in the application by which a microcube is defined as "a cube corner having a maximum area of about 0.0016 square inches (1 mm<sup>2</sup>)."

With respect to the particular prior art cited, Heasley '568 discloses hexagonal cube corner elements. Enclosed as Exhibit 1 hereto is a copy of the cover sheet of the Heasley '568 patent including Fig. 4 in which the outline of a hexagonal cube corner is indicated in orange. These hexagonal cube corner elements are outside the scope of claim 1. Further, the only dimensions disclosed in Heasley '568 are at column 4, lines 30-32, wherein it is stated "In one embodiment, each row was about 1/16 inch in height and the rows were spaced laterally (or horizontally as viewed in FIG. 3) about 1/6 inch." One sixteenth of an inch corresponds to a cube edge of 0.0625 inches (for a square cube) and to a cube area of .0039 inch, which is more than double the upper limit of the area of a "microcube" as defined by applicants in the instant specification. Accordingly Heasley does not anticipate any of the pending claims, all of which are specifically limited to non-hexagonal "microcubes."

Lindner '773 also does not disclose the particular microcube dimensions recited and claimed by applicants. The only place where Lindner '773 discusses any dimensions of the cubes is at column 2, lines 34-39, wherein it is stated that "... the size of individual facets, so far as effective usable area of retroreflectivity in a product individual unit is concerned, is characteristically (though not necessarily) small, being typically less than about 0.3 centimeters in maximum average dimensions, ...." The "facets" of Lindner are the individual faces of a cube, not the entire cube. See column 5, lines 42-44 and 55-60. A cube corner element having a facet dimension of 0.3 centimeters, or 3 mm, is necessarily well outside the scope of the definition of "microcube" as set forth in the instant specification, and therefore Lindner '773 cannot anticipate the instant claims. Further, as those skilled in the art would appreciate and as is explained in the instant application (page 9, line 15 - page 10, line 2), the grinding and cutting operations disclosed by Lindner for forming the facets (column 2, lines 24-25; column 6, lines 22-46) could not be used to obtain optically polished surfaces of the sizes recited and claimed in the instant application. Accordingly, neither Heasley '586 nor Lindner '773 anticipates the non-hexagonal microcubes recited and claimed in the instant application.

In paragraph 8, the Examiner rejected claims 1-11, 26, 29-30, and 94 as being anticipated by the aforementioned Heenan '090 patent. The Heenan '090 patent at column 10 describes a retroreflective "sheet" comprising square cells, each cell having four square cube corner elements arranged in a square pattern, each cell measuring .04 inches in length. This would correspond to individual square cube corner elements having a side dimension of 0.02 inch.

In order to anticipate, a reference must be enabling. See, e.g., *Akzo v. United States ITC*, 808 F.2d 1471, 1 USPQ2d 1241 (Fed. Cir. 1986). Applicants submit herewith evidence that the Heenan '090 patent is not enabling for the embodiment described at column 10. Specifically, the applicants submit herewith as Exhibits 2 and 3, respectively, the Declarations under 37 CFR § 1.132 of Mr. Paul W. Deuter and Mr. Anthony J. Montalbano. Mr. Montalbano is one of the co-inventors of the instant application (Ex. 3, ¶ 1). Mr. Deuter and Mr. Montalbano collectively have over 100 years of experience in the design and manufacture of tooling for use in the manufacture of cube corner retroreflective products. All of this experience was obtained by working at applicants' assignee and its various predecessors in interest (Ex. 2, ¶ 1; Ex. 3, ¶ 3). Messrs. Deuter and Montalbano each personally worked with Mr. Heenan (now deceased), the inventor of the '090 patent (Ex. 2, ¶ 9; Ex. 3, ¶ 11).

The Heenan '090 patent describes at column 10, lines 5-22 and at Figs. 9-12 a retroreflective "sheet" having square cube corner elements arranged in cells of four element each, the elements being arranged in each cell in a square pattern. The length of the side of each cell is 0.04 inch (col. 10, lines 12-13). This means that the length of the side of each square cube corner element in each cell is 0.02 inch (Ex. 2, ¶ 11; Ex. 3, ¶ 13). As explained in the instant specification at page 7, line 17 - page 8, line 18, prior to the instant invention square cube corner elements were made from pins having a cube corner ground on one end thereof. The smallest pins known to applicants were square pins measuring .04 inch across flats. See also Ex. 2, ¶ 7; Ex. 3, ¶ 9. As Messrs. Deuter and Montalbano each explain in their declarations, these were the smallest pins ever made by applicants' assignee for the manufacture of production parts (Ex. 2, ¶¶ 13, 14; Ex. 3, ¶¶ 15-16). These pins were used to make reflective strips to be mounted to the sides of automobiles and trucks (Ex. 2, ¶ 7; Ex. 3, ¶ 9). An experimental effort to make a sheet-type letter

"P" for a STOP sign out of .04 pins turned out to be very expensive and impractical because of the large number of small pins required; and this experiment was abandoned (Ex. 2, ¶ 15). Yet the cube corner elements described in the '090 patent at col. 10 would have had a cross-sectional area one-fourth that of the .04 pins actually used. Mr. Deuter and Mr. Montalbano each state that they are not aware that the assignee ever made a sheet product having the cube corner and cell dimensions described in col. 10 of the Heenan '090 patent, and that the Heenan '090 patent does not teach one skilled in the art how to make a retroreflective article having the cube shape, cube size, and other dimensions described in column 10 (Ex. 2, ¶¶ 12, 13; Ex. 3, ¶¶ 14, 15).

Further, each declarant states that, despite decades of familiarity with Mr. Heenan and his work and the assignee's products, he does not know what experimental work, if any, or what actual products, were being described or referred to in column 10 of the '090 patent (Ex. 2, ¶ 16; Ex. 3, ¶ 16).


The record evidence now in this case demonstrates that the Heenan '090 patent is not enabling for the embodiment described at col. 10 thereof. As such, that disclosure can not form the basis of a rejection of anticipation under 35 USC § 102. Accordingly, it is respectfully maintained that the ground for the rejection of paragraph 8 of the Office Action has been overcome.

In response to paragraph 9, claim 12 has been rewritten in independent form, including all of the limitations of base claim 1 and intervening claim 11. In accordance with 37 CFR § 1.121(c), the rewritten claim 12 is presented above in "clean" form, and attached herewith

is a separate page showing a "marked up" version of claim 12. Claim 13 has been canceled as being duplicative of claim 1 of U.S. 6,015,214.

It is believed that all of the grounds of rejection have been overcome by the foregoing amendment and response. Accordingly, a Notice of Allowance is respectfully requested.

Respectfully submitted,



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In re Application of:

HEENAN ET AL.

Serial No.: 09/453,327

Filed: December 2, 1999

For: RETROREFLECTIVE ARTICLES  
HAVING MICROCUBES, AND  
TOOLS AND METHODS FOR  
FORMING MICROCUBES

) Examiner: J. Phan

) Art Unit: 2872

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**MARKED UP VERSION OF CLAIM 12  
SUBMITTED WITH AMENDMENT AND REQUEST FOR  
A TWO-MONTH EXTENSION OF TIME DATED APRIL 5, 2001**

12. (Amended) An article comprising an array of microcubes, at least one of said microcubes being non-hexagonal, such that for every plane in space there are two adjacent microcubes for which at the place of the adjacency none of the face edges is parallel to that plane, in which array at least one said microcubes is canted, said array being formed of [in] a material having a refractive index  $n$ , and the cant of at least one microcube in said array does not exceed about  $\tan^{-1}\sqrt{2} - \sin^{-1}(1/n)$ .